

**METHOD AND APPARATUS FOR ATOMIC EMISSION SPECTROSCOPY**  
**ABSTRACT OF THE INVENTION**

A gas plasma emission source includes a solid state signal power source coupled to a resonant cavity. In an alternative embodiment of the invention, an atomic emission detector includes a solid state signal power source coupled to a resonant cavity and a spectrographic detector to sense atomic emissions from a gas within the resonant cavity. In yet another embodiment of the invention, a method of sustaining a plasma includes passing a gas through a resonant cavity and exciting the resonant cavity with signal power from a solid state power source to sustain the plasma in the gas. In another embodiment of the invention, a method of using a solid state power source includes passing a gas through a resonant cavity and coupling sufficient signal power from an output of the solid state power source to sustain a plasma in the gas where the sufficient power is less than 300 watts.